AMENDMENTS TO THE DRAWINGS:

Please find accompanying this response replacement sheets for Figs. 1, 2 and 7 wherein amendments explained in the Remarks presented below are effected.

REMARKS

The drawings have been objected to for not illustrating the plurality of fixing projectors as recited in Claim 14. Applicant has amended the claims to recite "protrusions" which are illustrated as element 2a.

The drawings have further been objected to for not illustrating the open groove 12. Applicant has amended the Figs. 1 and 2 to include such reference numeral.

The drawings have also been objected to for not illustrating the projection ring 31. Applicant has amended the specification to reference projection ring 3a which is disclosed in the application and illustrated in the figures.

The drawings have yet further been objected to because Fig. 7 has not been labeled "prior art". Applicant has amended the figure to include such labeling.

The specification has been objected to for including reference numerals in paragraphs 3 and 4 of the summary of the invention section. However, these numbers are required because they are not repeated in the detailed description section. Accordingly, absent of any regulation requiring such change, Applicant requests that the Examiner permit the presence of such reference numbers. Nonetheless, Applicant submits herewith a substitute specification in which nonsubstantive changes have been made which do not introduce new matter.

Claims 12-22 are pending and Claim 19 is rejected under 35 USC § 112, second paragraph. Applicant has amended the claim to overcome the rejection.

Claims 12-15, 18 and 19 have been rejected under 35 USC § 102(b) as being anticipated by Mann et al (USPN 5957890). Claims 16 and 17 are rejected under 35 USC § 103(a) as being unpatentable over Mann as modified by Davis (USPN 3217949).

Applicant has amended Claim 12 to recite:

"[[a]] an axially extending projecting holder, circumferentially around which a tubular body is capable of being wound, said projecting holder being formed to axially extend from ~~in~~ a center of said upper case;

a tubular body circumferentially wound against said projecting holder, said tubular body having opposite ends, both of which are wound around said projecting holder;

a branch conduit, ~~also~~ connected to said tubular body; and

said projection holder, said tubular body and said branch conduit each disposed within said outer case and radially spaced from said axially extending portions of said outer case"

Accordingly, the claim recites that the tube body is wound against the projection holder. This is inapposite with Mann which teaches a tube body 30 spaced 38 from a "projection holder" 34. As a result, ring 34 of Mann is not a "projecting holder" as claimed. Further, the claim recites that the tube body is radially spaced from the outer case. This too is inapposite with Mann which teaches winding the tube 30 against the outer case. Furthermore, the claim recites

that the branch conduit is radially within the outer case, and that the hose attaches to the conduit within the case. This is inapposite with Mann in which both the branch conduit and the hose, as identificd by the Examiner, are disposed exterior to the outer case.

Turning to Claim 14, the claim has been amended to recite " said protrusions and said grooves being idisposed within said outer case and radially spaced from said axially extending portions of said outer case". This is inapposite with Mann which teaches that the fixing protrusions 47 and grooves, as identified by the Examiner are disposed exterior to the outer case.

Furthermore, in comparing Mann to the claimed invention, the invention is directed to injecting liquid medicine into a tube while the reference is directed to a capillary vessel pressurizing means using purifying filtering and the reference is also directed to the manufacturing of an integrated container.

Accordingly, the claimed invention differs from the reference and is not anticipated by or rendered unpatentable thereover.

Applicant respectfully requests a three month extension of time for responding to the Office Action. **The fee of $510.00 for the extension is provided for in the charge authorization presented in the PTO Form 2038, Credit Card Payment form, provided herewith.**

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Applicant provides herewith two multidependent claims. **The fee of $180.00 for the claims is provided for in the charge authorization presented in the PTO Form 2038, Credit Card Payment form, provided herewith.**

If there is any discrepancy between the fee(s) due and the fee payment authorized in the Credit Card Payment Form PTO-2038 or the Form PTO-2038 is missing or fee payment via the Form PTO-2038 cannot be processed, the USPTO is hereby authorized to charge any fee(s) or fee(s) deficiency or credit any excess payment to Deposit Account No. 10-1250.

In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited.

Respectfully submitted,
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MARKED SPECIFICATION

F-8162 Ser. No. 10/822,592

DELIVERY APPARATUS FOR MEDICAL FLUIDS

BACKGROUND OF THE INVENTION

~~FIELD OF THE INVENTION~~

This invention relates to a medical apparatus, and, more particularly, to a device for delivering a specific volume of medical fluid via a tube.

~~TECHNICAL BACKGROUND AND DESCRIPTION OF THE PRIOR ART~~

Existing delivery apparatus for medical fluids utilizing tubes allow delivery of medical fluids by the expansion pressure of a tubular body which is inserted into a pipe-conduit having channels and which expands when medical fluid is injected.

However, its disadvantages are that delivery of a specific volume of medical fluid is impossible since such expansion results in different expansion pressure for the beginning and later periods of fluid delivery, and also because of being configured as a pipe-conduit, and thereby manufactured in an elongated shape, it is inconvenient to carry as it dangles loosely.

BRIEF SUMMARY OF THE INVENTION

The present invention seeks to overcome these problems in the prior art by providing a tubular-body, which when wound circularly, is reduced in size to a circular shape that maintains constant pressure both in the beginning and later

periods of a fluid delivery. Also because it is manufactured in a flat and round shape, it is easy to carry.

The present invention is a delivery apparatus for medical fluids, which utilizes a tubular body, wherein the tubular body is wound and fixed on a projecting holder and maintains the expansion pressure of the expanding tubular body the same for the beginning and later periods of fluid delivery; and has a flat shape, which not only makes it easy to carry, but also makes it possible to provide diverse designs.

In conventional delivery apparatus for medical fluids, as shown in Figure 7, utilizing a tubular body, a tubular body (300) is inserted into a pipe conduit (200) usually furnished with a channel, whereby in a state in which the tubular body is closely adhered to the pipe conduit, the medical fluid injected through the pipe conduit (400) enters into the tubular body through the channel and causes the tubular body, made of one layer, to expand.

Therefore, the expanded tubular body(300) allows medical fluid to be discharged with a strong pressure in the beginning, but, as time passes, the expanded, one-layered tubular body contracts, thereby, causing the pressure to drop, and results in a decrease in the volume of medical fluid being discharged, which is disadvantageous.

Accordingly, due to such structural shortcoming, when inserting the conventional tubular body into the pipe conduit, the tubular body is in a tightly-stretched state, that is, tightly-fitted into the pipe conduit, the tubular body is stretched and tightly adhered to the pipe conduit by strong pressure that is to compensate for that variation of pressure in the beginning and later periods.

However, in such case not only is there a difficulty in assembly but also there are limitations in selecting material for the tubular body that does not change when it expands. And in such a case, there is a disadvantage of the initial pressure being too strong.

Moreover, another disadvantage is that it is impossible to offer variety in design since the shape of the final product is merely a simple pipe type.

Therefore, the present invention, having a tubular body wound up in two layers on a round projecting holder, and thereby maintaining constant pressure of the tubular body when expanded by the injection of medical fluid, in the beginning and later periods, solves, the problems of the prior arts and also makes it possible to offer a variety in design.

BRIEF DESCRIPTION OF THE DRAWINGS

Accompanying the specification are figures which assist in illustrating the embodiments of the invention, in which:

Figure 1 is a perspective view showing an example of the assembled structure of the invention[[.]];

Figure 2 is a perspective view showing another example of the assembled structure[[.]];

Figure 3 is a plan view showing affixation of a tubular-body in a stretched state[[.]];

Figure 4 is a perspective view showing the outer appearance of the assembly[[.]];

Figure 5 is a cross-sectional view showing an upper case and a lower case, connected with an intermediate-ring[[.]];

Figure 6 is a cross-sectional view of a lid[[.]]; and

Figure 7 is a cross-sectional view of the prior art.

DETAILED DESCRIPTION ~~OF PREFERRED EMBODIMENTS~~ OF THE INVENTION

~~The preferred embodiments~~ Embodiments of the apparatus of the present invention are described in detail below referring to the attached drawings.

In one embodiment of the present invention, the structure an upper case (10) and lower case (20), which are assembled as counterparts, and such counterpart assembly enables detaching.

Additionally, this embodiment of the apparatus is equipped with a separate[[i]] intermediate ring (30) of specific width, in between of the upper case (10) and the lower case (20), which not only enables easy assembly and a variety of designs, but also adjustment of the volume of medical fluid capable of being contained, according to the width of the intermediate ring.

As shown in Figure 1, this invention includes an upper case (10), wherein a projecting holder (11) is formed in the center of the upper case (10) for the tubular body to be wound upon, a tubular body (1) of which both ends are connected to each other and affixed to a branch conduit (2) by affixation member (3), in order to wind onto the projecting holder (11), and a hose (100) is connected to the branch conduit for the flow of medical fluid. At the branch conduit 2, an injection port for injection of medical fluid is formed and is exposed to the outside of the case.

Additionally, the inner wall of the lower case (20) adheres in parallel as tightly as possible to, or occludes in the tightly-adhered stated with, the projecting holder (11) of the upper case (10) to prevent the tubular body (1), wound on the projecting holder (11), from separating and being crushed. An open groove (12) which has a bore wide enough for the branch conduit (2) to fit is formed to affix the branch ~~conduict~~ conduit (2)[[,]]. In order to prevent the branch conduit (2) fitted in to above open groove (12) from separating, a protrusion (22) is formed at

the lower case (20) to occlude with the open groove (12). ~~and the~~ The open groove (12) is equally divided between the upper case (10) and the lower case (20), with which it combines, and that allows for secure affixing by application of pressure.

Since this is an already known method, a variety of methods will be apparent to the person of ordinary skill in the art.

Therefore, medical fluid when injected into the hose for medical fluids (100), flows into the branch conduit (2) and expands the tubular body (1). Since the expanded two-layered tubular body (1) tightly adheres to the projecting holder (11) and winds circularly therearound, it contracts ~~as a whole~~ with the two layers at the same time when contracting and thereby, the change of its expansion pressure in the beginning and later periods becomes reduced.

Furthermore, as shown in Figure 2, when an intermediate ring of a specific width is employed between the aforementioned upper case (10) and lower case (20), it is not necessary to prepare additional upper cases (10) and lower cases (20) for situations of different injection volume of medical fluids. By varying the width of the intermediate ring, it is easy to change its shape according to the different volumes, and thus being able to immediately deliver upon the demand of consumers is its advantage. And it is also possible to offer a variety of designs by making the intermediate ring (30) in various colors.

Additionally, the combining method to affix the branch conduit (2) is by forming fixing protrusion (2a) on the branch conduit (2) and by forming fixing grooves (14) on the counter parts of the upper case (10) and lower case (20), which thereby allow firm affixation by combining upon applying force. And an injection port (2b) is formed on the branch conduit (2) and is combined with an injection valve (40) that has one directional flow, whereby the injection valve (40) is exposed through a passageway hole (13) of the upper case (10) and thereafter, medical fluid is injected through the injection valve (40) which is exposed through the passageway hole (13).

A lid (50), which opens and closes when pressed, is formed in order to cover the passageway hole (13) of the upper case (10) for preventing outside foreign material from entering.

The lid (50) used herein has a scored folding line (51), on the inside of which is formed a slot (52) of V-shape, and the inner side of the scored folding line (51) is fixed to the upper case, so that the outer side is raised to open and close, when the scored folding line is pressed, and a tip of the outer side combines with the upper case (10) having a stopper (15) to allow the passageway hole (13) to open and close.

There is a variety of known methods for the manufacture of a stopper, whercin the stopper can be formed on the lid.

The branch conduit (2), to which both ends of the tubular body (1) is connected and fixed, is made out of material that does not expand due to the injection of medical fluids. A variety of known methods can be used to affix the tubular body (1) connected to such branch conduit (2).

However, affixing with an additional affixation member (3), with double sheathing, if possible, is necessary in order to prevent it from detaching or cracking, while in a fixed state, due to expansion pressure, and such double sheathing is possible whether its material is made of the same or a different material as that of the tubular body.

Additionally, to prevent detaching, on the branch conduit (2) is formed a recess groove (2c) which is sufficiently large enough to allow the affixation member (3) to be inserted through, and on the recess groove is further formed a rabbet groove (2d), which a projecting ring[[(31)]] (3a), formed on the affixation member, is fitted into and affixed, and that prevents detaching.

Furthermore, as shown in Figure 1, by forming the affixation member in two-layers, and in order to induce an elastic operation in a situation where the

affixation member is made out of stiff material, and by having the inside of the affixation member incised and the outside not incised, enables solid affixation.

Additionally, when such affixation member is double sheathed, using the same material as that with which the tubular body is made, and afterward is also fixed using a fixing band, it has the same effect of affixation.

When pressure is applied for affixing, the skin of part of the tubular body becomes thin, which could expand and crack when pressure is delivered for injection of medical fluid. Double sheathing can solve such a problem.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not as restrictive. The scope of the invention is, therefore, indicated by the appended claims and their combination in whole or in part rather than by the foregoing description. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.

~~10: upper case~~ ~~20: lower case~~

~~30: intermediate ring~~ ~~40: valve~~

~~50: lid~~